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# Global Observations for Climate Model Evaluation

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with R. Ferraro, J. Jiang, F. Li, H. Su, D. Waliser

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# New initiative to include observations in CMIP process

Traditional model  
comparison path

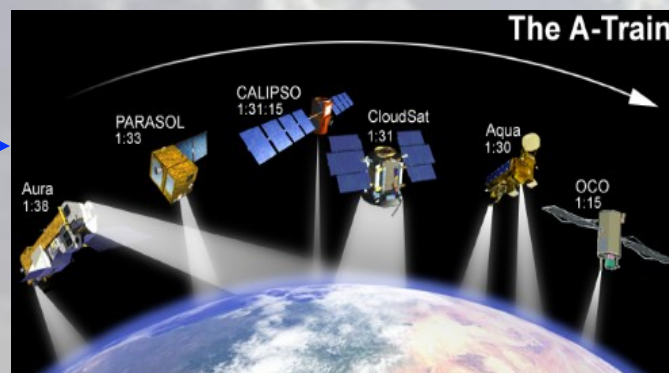
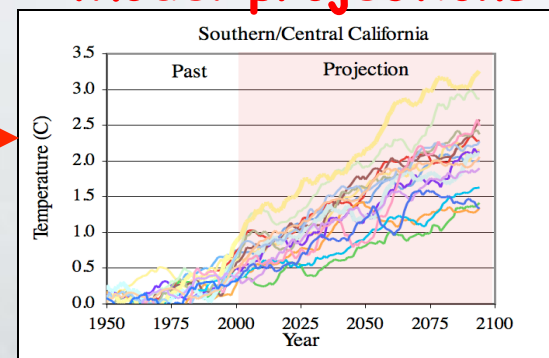
International  
working  
groups (e.g.  
WGCM)

New path to insert  
observations

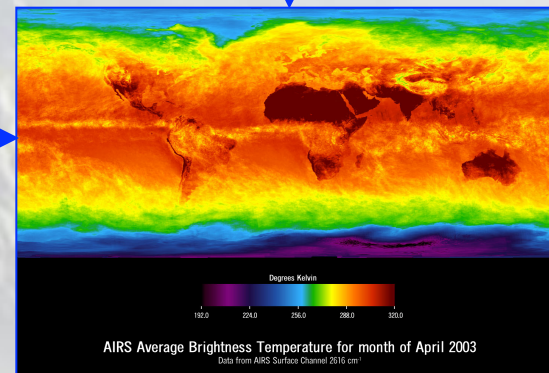
Climate models



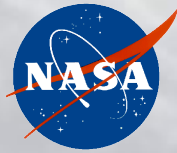
Model projections



Climate satellites



Satellite observations

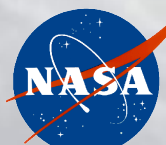


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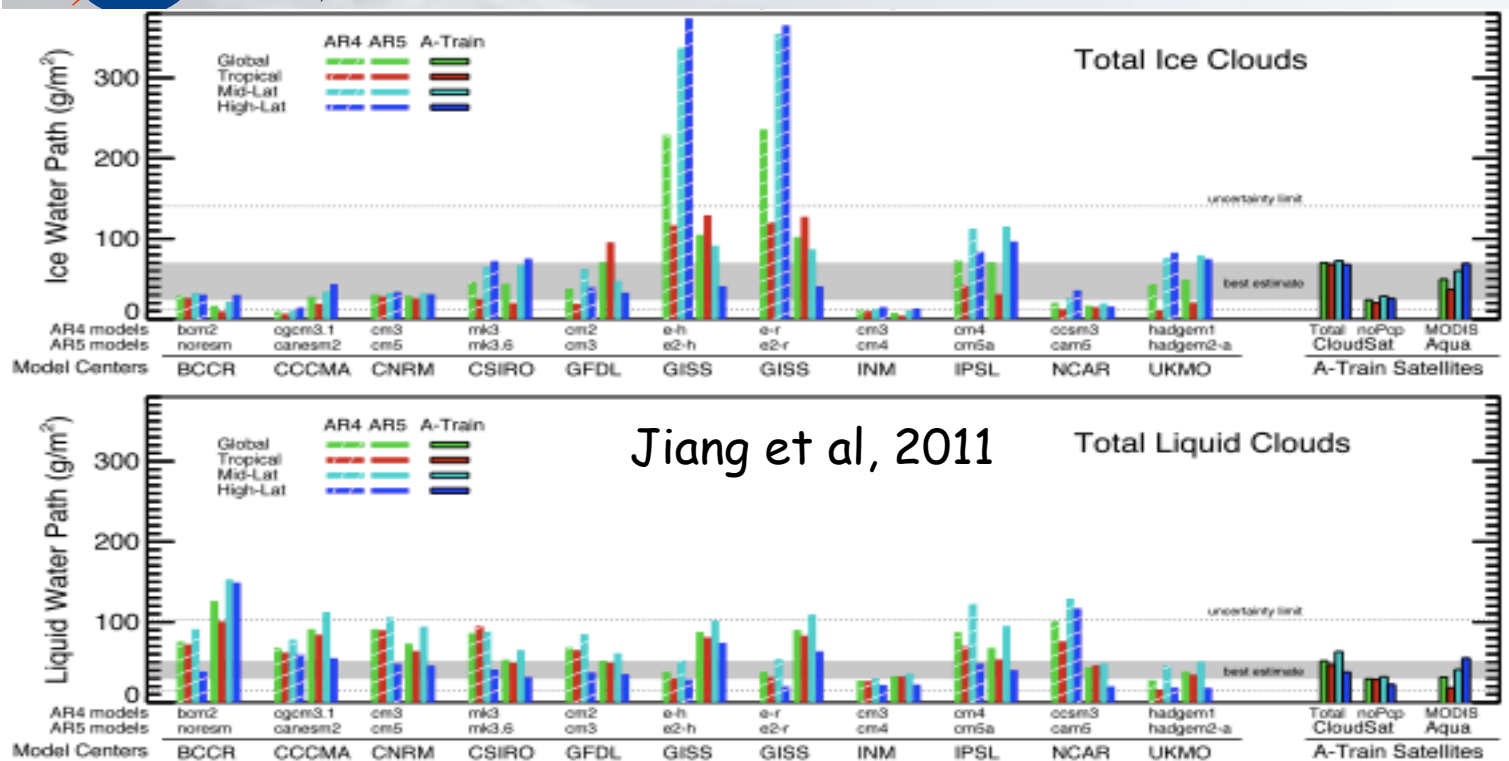
# Observations for CMIP5 Simulations

- ❑ **Objective:** to provide climate community observational data analogous to CMIP5 model data - same periods, variables, output frequency, formats
- ❑ **Key:** CMIP5 protocol document (Taylor et al., 2008) is followed strictly
- ❑ Carried out in close coordination with PCMDI/DOE and ESG
- ❑ Directly engages NASA mission and instrument science teams
- ❑ Variety of NASA observations are now available at CMIP5 websites

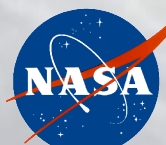


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# CMIP3 versus CMIP5: Models and Observations

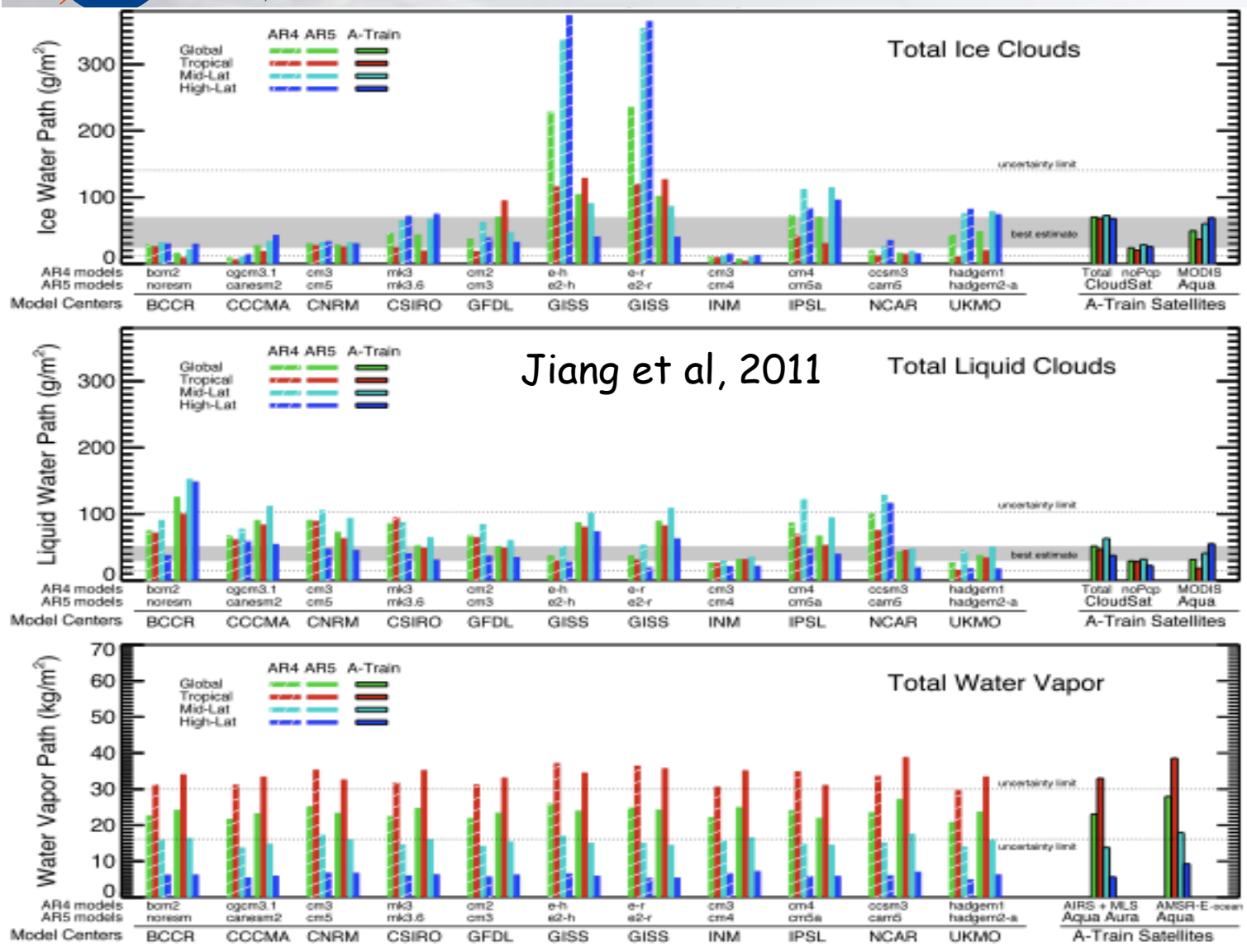


Significant  
uncertainty in  
cloud water ...



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# CMIP3 versus CMIP5: Models and Observations



Jiang et al, 2011

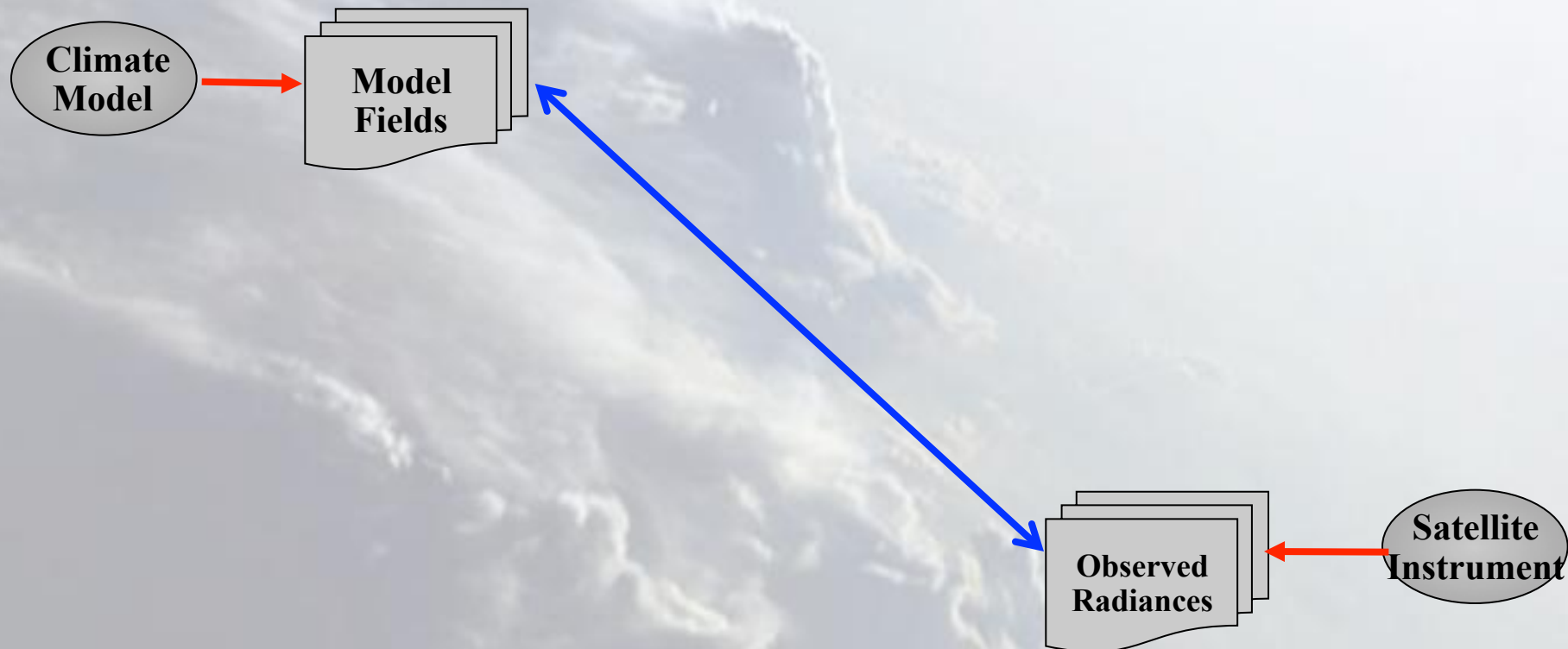
Significant  
uncertainty in  
cloud water ...

But large  
uncertainty in  
water vapor



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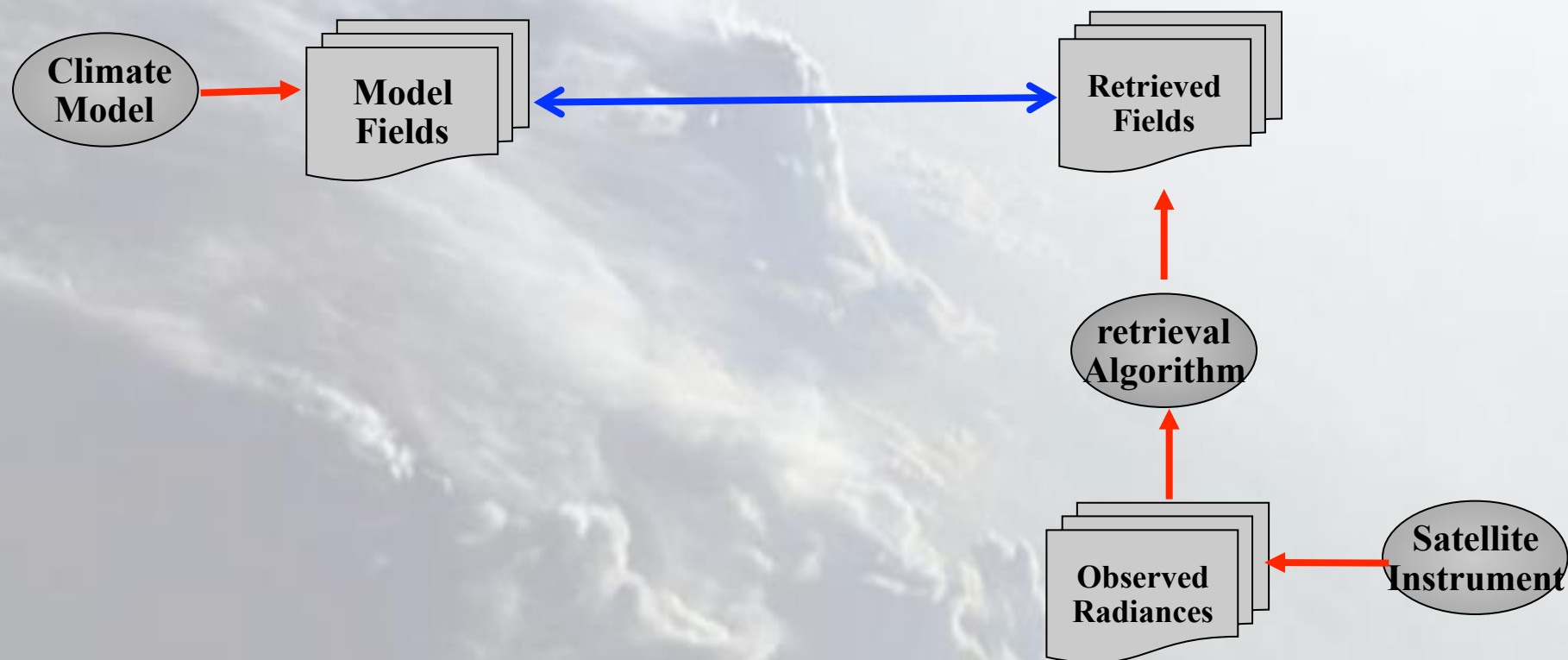
# Climate Models versus Satellite Observations: Stage 1

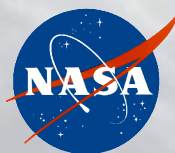




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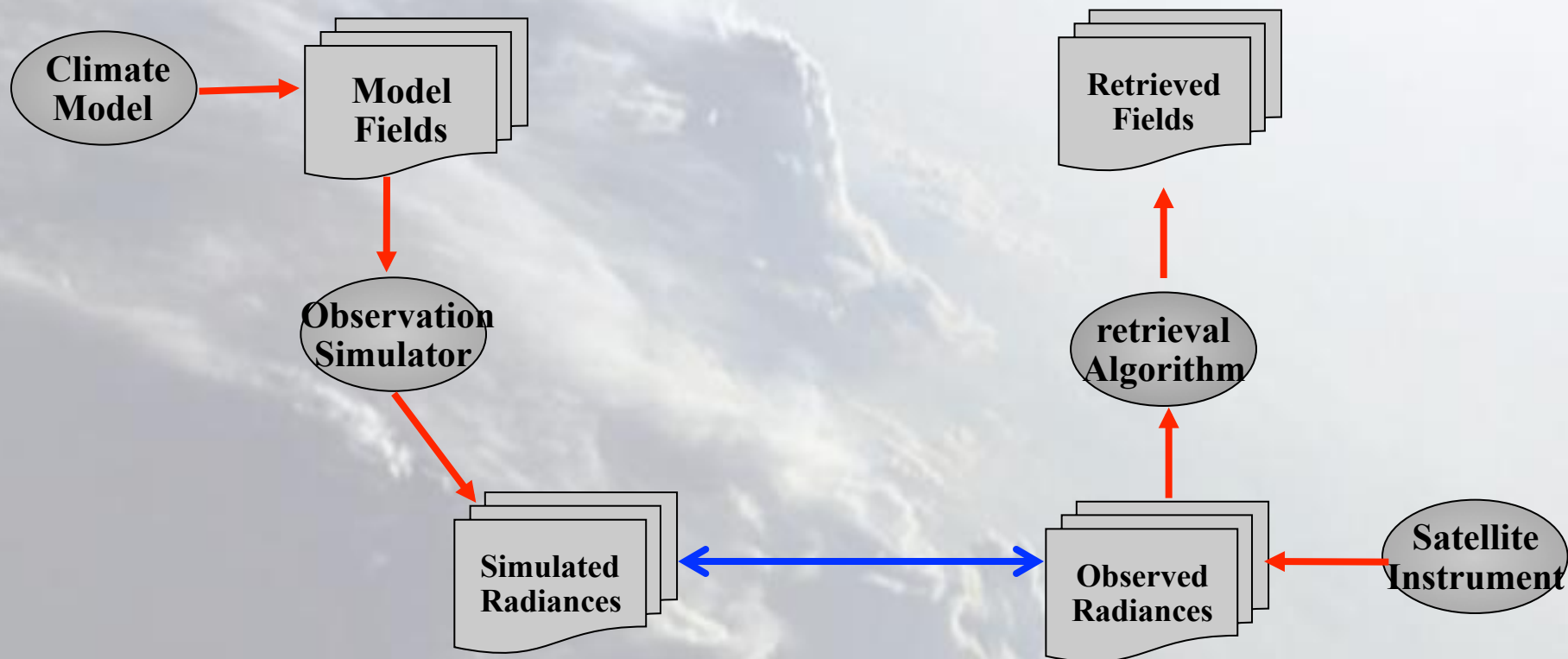
# Climate Models versus Satellite Observations: Stage 2

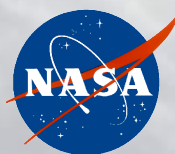




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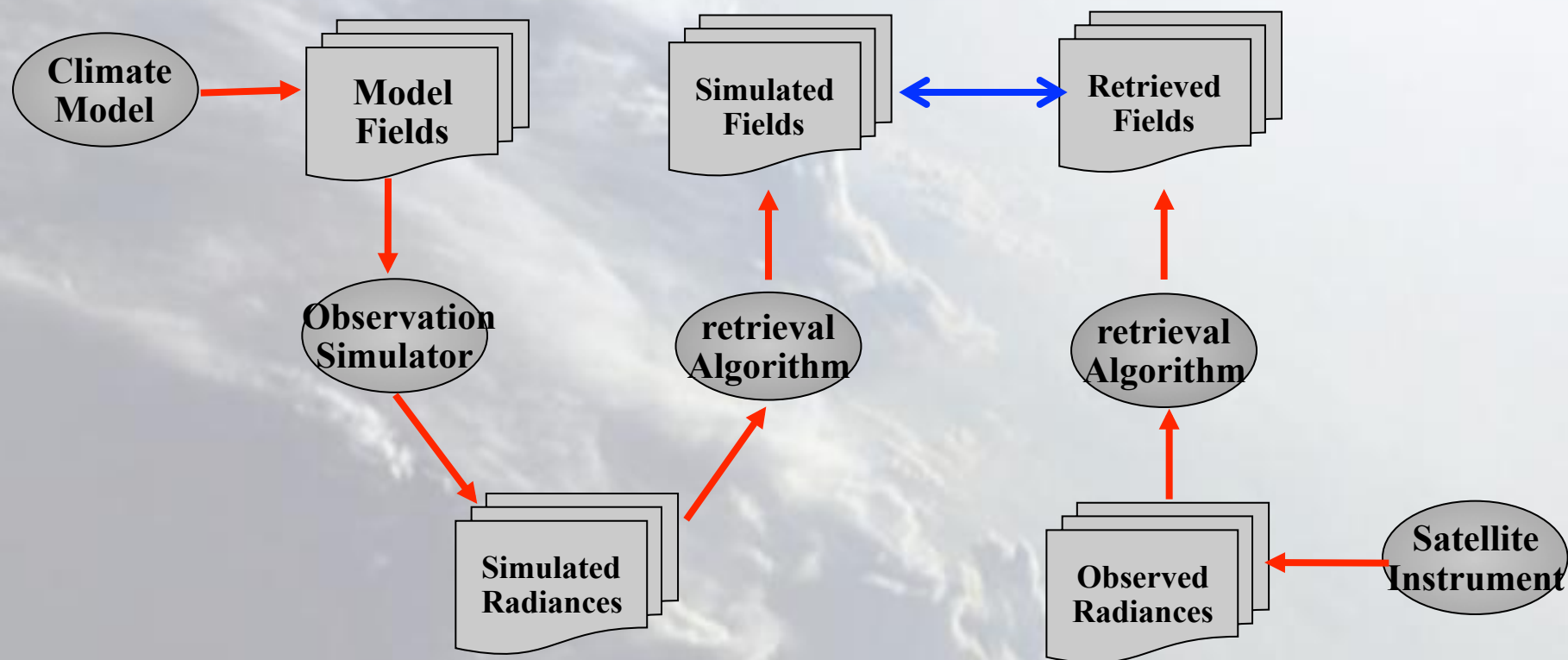
# Climate Models versus Satellite Observations: Stage 3





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## Climate Models versus Satellite Observations: Stage 4



In stage 4: retrieval issues are taken into account and models/  
observations are compared in geophysical variables

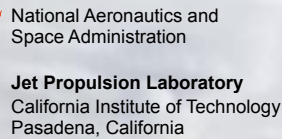


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# Summary

- How to provide observations to CMIP?  
Effort is underway to provide access to observations for CMIP5
- How to compare models and satellite observations?  
Satellite simulators and beyond ...
- New observations and satellite missions - Model evaluation/development  
can play key role in designing future missions



# Satellite Observations for CMIP5 Simulations


## ESG-JPL Gateway : Side by Side Archive



**Search:**  **for:**

To conduct a search, select a category from the pull down menu and/or enter free text in

- Project
  - > CMIP5
  - > TAMIP2
  - > gfdl\_test
  - > obs4MIPs
- + Institute
- + Model
- + Experiment
- + Frequency
- + Product
- + Realm
- + Variable
- + Ensemble



The Program for Climate Model Diagnosis and Intercomparison was established in 1989 at the Lawrence Livermore National Laboratory, located in the San Francisco Bay Area. Our staff includes research scientists, computer scientists, and administrative personnel.

The PCMDI mission is to develop improved methods and tools for the diagnosis and intercomparison of general circulation models (GCMs) that simulate the global climate. The need for innovative analysis and simulation techniques is apparent, as increasingly more complex GCMs are developed, while the disagreements among these simulations increase. To improve our understanding of the climate system, the results of GCMs for simulation must be accounted for in the context of observational data.

**obs4MIPS**

obs4MIPS  
Project

6/3/2011: CNRM-CERFACS decadal hindcast/forecast datasets available for all realms but sea-ice (10 members already available for realm ocean, only 3 so far for realms land/atmos/landice).  
6/25/2011: PCMDI CMIP5 data server is back online. The INM datasets are available.  
7/7/2011: NCC datasets are now available to all users.  
7/19/2011: PCMDI data server will be down for maintenance. PST. It is expected back online 7/20 17:00 PST.  
7/20/2011: PCMDI data server is back online.  
7/20/2011: Because of a processing fault affecting the MOHC rcp85 data from 2080 onwards, this data has been withdrawn being. They expect to provide us with corrected data in a matter of days. A new version of these datasets will be published at which time a new version of these datasets will be published.  
9/7/2011 - 9/9/2011: The BADCFESG system will be unavailable September 7th and 8th. As a precaution you should consider "At Risk" on Friday September 9th.



**Search:**  **for:**

To conduct a search, select a category from the pull down menu and/or enter free text into the the text box.

Please note that the NASA datasets accessible through this gateway are provided as part of an experimental activity to increase the usability of NASA satellite observational data for the model and model analysis communities. These are not standard NASA satellite instrument products. They may have been reprocessed, reformatted, or created solely for comparisons with the CMIP5 models. Community feedback to improve and validate the dataset for modeling usage is appreciated.

- Project
  - > CMIP5
  - > obs4MIPs
  - Institute**
- + Model
- + Experiment
- + Frequency
- + Product
- + Realm
- + Variable



[AIRS Data Catalog at ESG](#)  
[Documentation: Air Temperature](#)  
[Documentation: Specific Humidity](#)  
[AIRS Home at NASA/JPL](#)



AMSR-E Data Catalog at ESG Documentation  
**AMSR-E Home at NSIDC**

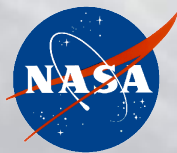
 **AVISO Data Catalog at ESG**  
**Documentation: Sea Surface Height (SSH)**  
**AVISO Home**

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 Microwave Limb Sounder



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- BADC Gateway
- DKRZ Gateway
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## This afternoon's session ....

### Session 3: Climate Model Evaluation & Invited Climate Modeling Presentations (Chair: Joao Teixeira)

Joao Teixeira	JPL	Satellite Observations for CMIP5/IPCC	1:30 PM
Jerry Potter	GSFC	A perspective on CMIP5: from the simple beginning of model intercomparison to an international effort	1:50 PM
Brian Medeiros	NCAR	Evaluating CAM's clouds with satellite simulators	2:20 PM
Claire Radley	GFDL	Comparison of GFDL's atmospheric models with observations during El Nino events	2:50 PM
Hui Su	JPL	Process oriented quantitative assessment of IPCC AR5 model simulations of clouds and water vapor using A-Train observations	3:20 PM
<b><i>BREAK (Afternoon Light Refreshments)</i></b>			<b><i>3:40 PM</i></b>
Baijun Tian	JPL	Evaluating CMIP5 models using AIRS temperature and water vapor profiles	4:00 PM
Amy Braverman	JPL	Likelihood-based evaluation of CMIP5 decadal experiment runs and AIRS water vapor data	4:20 PM